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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/003,290	12/06/2001	Jung Jin Ju	P67379US0	5077

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EXAMINER
CALEY, MICHAEL H

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 06/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/003,290	JU ET AL.	
	Examiner	Art Unit	
	Michael H. Caley	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-8 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-8 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

Claim 8 is objected to because of the following informalities:

In line 13, "nonlinear polymer wavelength" should read --nonlinear polymeric waveguide--

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Khodja (U.S. Patent No. 5,943,464).

Khodja discloses a method for converting the wavelength of a signal beam combined to a pump beam (Figure 3; Column 6 lines 63-67) comprising the steps of:

providing a channel type polymeric waveguide including nonlinear polymer in the middle of the waveguide (Column 8 lines 52-60; Figure 3 element 45);

poling the polymer along a predetermined direction by applying a voltage to the polymeric waveguide; and

making the signal beam combined to the pump beam pass through the polymer waveguide in which the polymer is in a poled state (Column 6 lines 41-43; Figure 3).

Regarding claim 3, Khodja discloses applying a voltage in a direction perpendicular to the direction in which the signal beam passes through the polymer waveguide during the polymer poling step (Figure 2).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2 and 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Khodja in view of Stamnitz et al. (U.S. Patent No. 4,913,507 "Stamnitz")

Regarding claims 2 and 4, Khodja discloses combining the signal beam and the pump beam at a direction combining means (Figure 2). Khodja fails to disclose passing the pump beam through a polymeric mode converter before the signal beam is combined to the pump beam. Khodja, however, recognizes the need for providing a pump signal at the lowest-order mode of the waveguide in order to realize the most efficient frequency conversion (Column 5 lines 18-27). Stamnitz teaches the use of a mode field conditioner for converting and optimizing the mode of a laser beam for use in a nonlinear device such as a frequency converter (abstract, Column 4 line 56 - Column 5 line 18).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have made the pump beam pass through a polymeric mode converter before

combining the signal beam with the pump beam. As is generally desired in the art, Khodja discloses the wavelength converter as operating most efficiently when the pump beam is provided in the lowest-order mode. Thus one would have been motivated to employ a mode converter such as taught by Stamnitz in order to optimize the pump beam propagating mode and mode field to ensure the highest wavelength conversion efficiency possible. By employing such techniques, the designer would achieve an efficient wavelength converter with a lower power consumption. Additionally, the designer would have been motivated to include such a mode conversion device integrally with the wavelength converter. Since the mode converter would be coupled directly to the wavelength converter, space may be conserved by including both devices on a same polymeric substrate.

Regarding claims 5-7, Khodja discloses the polymeric waveguide as formed to show a channel type shape having a rectangular cross-section (Column 8 lines 52-60) and the polymeric waveguide as wrapped by a cladding (Figure 2). Khodja fails to disclose the mode converting region as wrapped by the same cladding and the side surface of the mode converting region as exposed at an input side and the side surface of the wavelength converting region as exposed at an output side. Stamnitz, however, teaches the use of a mode field conditioner for converting and optimizing the mode of a laser beam for use in a nonlinear device such as a frequency converter (abstract, Column 4 line 56 - Column 5 line 18). Additionally, Khodja recognizes the need for providing a pump signal at the lowest-order mode of the waveguide in order to realize the most efficient frequency conversion (Column 5 lines 18-27).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided a polymeric waveguide with the input and output configured as

proposed. One would have been motivated to provide such a device for an application such as a duplexer (Khodja: Figure 3; Column 6 lines 1-67) in which a sole purpose is to convert the wavelength of the signal. In such a device the pump beam may require a mode conversion prior to entering the wavelength converter, thus it would have been straightforward to provide the mode converter on the input side and the wavelength converter on the output side.

Particular to claims 6 and 7, it would have been an engineering expediency to either taper or not taper the mode converting region. Such a taper or lack thereof is useful for compensating for differences between the inputted waveform of the pump beam and the physical characteristics of the wavelength converting region. If the mode field of the pump beam is already optimized upon entering the polymeric substrate, then no mode conversion is required and the channel type would not require a taper. Otherwise, a taper in the waveguide would be an effective means to create a mode conversion prior to entering the wavelength converter.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Khodja in view of Stamnitz and in further view of Khanarian et al. (U.S. Patent No. 5,061,028 "Khanarian").

Khodja fails to disclose the voltage applying metal electrodes of the nonlinear polymer as vacuum-evaporated to the nonlinear polymeric waveguide. Khanarian, however, teaches a similar polymeric wavelength conversion device having electrodes which are vacuum-evaporated to the nonlinear polymeric waveguide (Column 5 lines 37-45).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have vacuum evaporated the electrodes to the device disclosed by Khodja. Khanarian teaches such a method as optimal for attachment of the electrodes for such an

application citing it as an appropriate means for the electrode of a given material, thickness, and attachment surface. One would have been motivated to use such a method in the device disclosed by Khodja to benefit from an old and known method of electrode deposition, benefiting from the known advantages of using such a method.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 5,912,910 to Sanders et al. as an alternative means of providing a pump and signal to a wavelength conversion device.

U.S. Patent No. 5,064,265 to Khanarian et al. as an alternative means of providing a pump and signal to a wavelength conversion device.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael H. Caley whose telephone number is (703) 305-7913. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

mhc
June 6, 2003

DAVID V BRUCE
PRIMARY EXAMINER